भारतीय मानक **IS 8267 : 2023**

Indian Standard

डेलापोन-सोडियम, तकनीकी —
विशिष्टि

(पहला पुनरीक्षण)

Dalapon-Sodium Technical — Specification

(First Revision)

ICS 65.100.20

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भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
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February 2023 **Price Group 5**

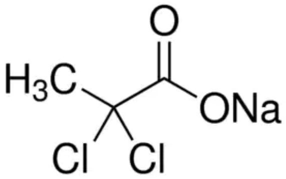
Pesticides Sectional Committee, FAD 01

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Pesticides Sectional Committee had been approved by the Food and Agriculture Divisional Council.

Dalapon-sodium is a selective contact herbicide, translocated from foliage to roots. It is used for the control of annual and perennial grasses.

Dalapon-sodium is the common name for sodium 2, 2-dichloropropionate. The empirical and structural formulae and the molecular mass of dalapon-sodium are as indicated below:

Empirical Formula	*Structural Formula*	*Molecular Mass*
$C_3H_3Cl_2NaO_2$		165.0

This standard was first published in 1976. In this revision, the standard has been brought out in the latest style and format of the Indian Standards, and references to Indian Standards wherever applicable have been updated. It also incorporates one amendment issued to this standard.

In the preparation of this standard due consideration has been given to the provisions of the *Insecticides Act*, 1968 and the Rules framed thereunder. However, this standard is subject to the restrictions imposed under these, wherever applicable.

The composition of the committee responsible for the formulation of this standard is given in Annex E.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

DALAPON-SODIUM TECHNICAL — SPECIFICATION

(First Revision)

1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for dalapon-sodium, technical.

2 REFERENCES

The standards given below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards.

IS No.	*Title*
IS 460 (Part 1) : 2020	Test sieves — Specification: Part 1 Wire cloth test sieves (*fourth revision*)
IS 1070 : 1992	Reagent grade water — Specification (*third revision*)
IS 8190 (Part 1) : 1988	Requirements for packing of pesticides: Part 1 Solid pesticides (*second revision*)
IS 10946 : 1996	Methods of sampling for technical grade pesticides

3 REQUIREMENTS

3.1 Description

The material shall consist of the sodium salt of 2, 2-dichloropropionic acid and shall be in the form of white to tan-white hygroscopic powder. It shall be free from extraneous impurities and added modifying agents.

3.2 The material shall also comply with the requirements specified in Table 1.

Table 1 Requirements for Dalapon-Sodium, Technical

(*Clause* 3.2)

Sl No.	Characteristic	Requirement	Method of Test, Refer to
(1)	(2)	(3)	(4)
i)	Dalapon-sodium content, percent by mass, *Min*	85.0	Annex A
ii)	Loss on drying, percent by mass, *Max*	3	Annex B
iii)	Water insoluble material, percent by mass, *Max*	1.0	Annex C
iv)	Coarse material insoluble in water (retained on 150-micron IS Sieve), percent by mass, *Max*	0.2	Annex D

4 PACKING

The material shall be packed in clean and dry containers made of fibre board or mild steel or tin-plate lined with polyethylene liner of thickness not less than 0.062 mm. The container shall also comply with the general requirements specified in **2** of IS 8190 (Part 1).

5 MARKING

5.1 The containers shall be securely closed and shall be bear legibly and indelibly the following information:

a) Name of the material;
b) Name and address of the manufacturer;
c) Batch number;
d) Date of manufacture;
e) Date of expiry;
f) Net quantity;
g) Active ingredient content, percent (*m/m*);
h) Cautionary notice as worded in the *Insecticides Act*, 1968, and Rules framed thereunder; and
j) Any other information required under the *Legal Metrology (Packaged Commodities) Rules*, 2011.

5.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

6 SAMPLING

Representative sample of the material shall be drawn according to IS 10946.

7 TESTS

7.1 Tests shall be carried out as specified in col 4 of Table 1.

7.2 Quality of Reagents

Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the test results.

ANNEX A

[*Table* 1, *Sl No.* i)]

DETERMINATION OF DALAPON-SODIUM CONTENT

A-1 GENERAL

For the determination of active ingredient in dalapon-sodium, two methods have been prescribed. However, in case of dispute, the infrared spectrophotometric method shall be considered as reference method.

A-2 INFRARED SPECTROPHOTOMETRIC METHOD

A-2.1 Principle

The sodium salt is converted to the corresponding acid which is extracted into carbon disulphide. The absorbance of the extract is compared to that of the absorbance of an extract of a standard by infrared spectrophotometer.

A-2.2 Apparatus

A-2.2.1 *Infrared Spectrophotometer*

It shall be capable of recording in the region of 7 micron to 16 micron, with the slit width, gain and response time and scanning speed adjustable to produce a satisfactory signal-to-noise ratio and adequate resolution under the conditions of test.

A-2.2.2 *Absorption Cells* — scaled absorption cells, having an internal light path of 1.0 mm.

A-2.3 Reagents

A-2.3.1 *Carbon Disulphide* — analytical reagent grade.

A-2.3.2 *Sulphuric Acid* — 25 percent (*v/v*).

A-2.3.3 *Standard 2, 2-Dichloropropionic Acid* — having known purity of more than 99 percent.

A-2.3.4 *Sodium Chloride* — analytical reagent grade.

A-2.4 Procedure

A-2.4.1 *Calibration*

A-2.4.1.1 Weigh accurately 370 mg of standard 2, 2-dichloropropionic acid in a 50 ml volumetric flask, dissolve in carbon disulphide and dilute to the mark.

A-2.4.1.2 Fill the absorption cell with carbon disulphide. Adjust the spectrophotometer to the optimum instrument settings with respect to gain, slit width, response, speed and drum drive. Make scan with carbon disulphide in the cell over the wavelength region of 7 micron to 16 micron.

A-2.4.1.3 Turn the wavelength scale back to its original setting. Fill the cell with solution (*see* **A-2.4.1.1**). Make a scan in the wavelength region of 7 micron to 16 micron, with the same setting as previously used (*see* **A-2.4.1.2**).

A-2.4.1.4 With the base line drawn from 8.6 to 9.8 microns, measure the absorbance of the solution at 8.9 micron.

A-2.4.2 *Estimation of Active Ingredient in the Material*

Weigh accurately 500 mg of the sample in a 50 ml volumetric flask, add 1 ml of sulphuric acid and mix. Add 50 ml of carbon disulphide and 2 g of sodium chloride. Shake to dissolve.

A-2.4.2.1 Make a scan of carbon disulphide and the carbon disulphide solution of the material (*see* **A-2.4.2**) as prescribed under **A-2.4.1.2** and **A-2.4.1.3** using the same cell and setting, Measure the absorbance as prescribed in **A-2.4.1.4**.

A-2.5 Calculations

$$\text{Dalapon-sodium, percent by mass} = \frac{A}{A_1} \times \frac{M}{M_1} \times 1.154 \times 100$$

where

A = absorbance of the sample solution (*see* **A-2.4.2.1**);

M = mass in g of standard 2, 2-dichloropropionic acid taken for test (*see* **A-2.4.1.1**);

A_1 = absorbance of the standard solution (*see* **A-2.4.1.4**); and

M_1 = mass in g of the sample taken for test (*see* **A-2.4.2**).

A-2.6 Precision

For judging the acceptability of the results, duplicate results by the same operator shall not differ by more than 1 percent of the mean value.

A-2.7 Identification

Compare the entire spectrum (7 micron-16 micron) of the sample with that of standard to ascertain the identity. The sample may show impurity bands of 2, 2-chloropropionic acid at 8.3 micron and 10.1 microns; 2, 2, 3-trichloropropionic acid at 10.05 micron and 13.3 micron; dichloroacetic acid at 12.2 micron and trichloroacetic acid at 12.1 micron.

NOTE — The above components do not interfere with the assay.

A-3 TITRIMETRIC METHOD

A-3.1 Principle

The complex formed by reacting dalapon-sodium, mercuric and cupric nitrates is filtered off, decomposed with aqueous potassium iodide and the potassium hydroxide thus formed is titrated with standard acid.

A-3.2 Apparatus

A-3.2.1 *Conical Flasks* — 250 ml capacity, with ground joint.

A-3.2.2 *Reflux Condenser*

A-3.2.3 *Sintered Glass Crucible* — 60 ml capacity.

A-3.2.4 *Water Bath*

A-3.3 Reagents

A-3.3.1 *Cupric Mercuric Nitrate Solution*

It shall be prepared by dissolving 100.0 g of yellow mercuric oxide and 60.0 g of cupric nitrate $[Cu\ (NO_3)_3.3H_2O]$ in 500 ml of nitric acid in a 1 litre volumetric flask. Make up the volume with water and filter.

A-3.3.2 *Potassium Iodide Solution*

It shall be prepared by dissolving 150 g of potassium iodide in water and dilute to 1 litre. Make solution neutral to phenolphthalein.

A-3.3.3 *Standard Hydrochloric Acid* — 1 N.

A-3.3.4 *Phenolphthalein Indicator Solution*

A-3.4 Procedure

A-3.4.1 *Complex Formation*

Weigh accurately, a sufficient quantity of the sample to contain between 0.17 g and 0.19 g of dalapon, from a closed weighing bottle into the conical flask with the ground neck. Pipette 100 ml of mercuric nitrate solution into the flask, add some glass beads, attach the condenser and reflux for 15 minutes, after boiling starts. Cool the flask and contents to room temperature.

A-3.4.2 *Isolation of Complex*

Filter off the precipitate with suction using the crucible and a buchner flask. Wash the conical flask and precipitate with water until free from acid. Discard the filtrate and washings.

A-3.4.3 *Decomposition of the Complex*

Pour 50 ml potassium iodide into the conical flask to dissolve any remaining precipitate. Then add this solution to the precipitate in the crucible and stir until the precipitate dissolves. (If all the precipitate does not dissolve after 2 minutes then it is to be assumed that the residue is not dalapon-mercury complex). Apply vacuum and filter the solution containing the dissolved precipitate into a clean buchner flask. Transfer the filtrate to a conical flask, washing the crucible and Buchner flask, with small amounts of potassium iodide. The total volume of the washings shall not exceed 100 ml, put some glass beads in the flask containing the filtrate, stopper with a bunsen valve, bring to boil quickly, boiling for one minute only. Cool quickly, under a cold water tap. Titrate immediately, with standard hydrochloric acid using phenolphthalein as an indicator.

NOTE — Carry out a preliminary run to determine the correct proportions of sample and reagent. It is important to titrate as quickly as possible. If the potassium iodide is allowed to stand for any length of time the titre is reduced.

A-3.5 Calculations

Dalapon-sodium (uncorrected for sodium pyruvate), percent by mass = $\frac{4.499 \times v \times N}{m}$

where

v = volume in ml of standard hydrochloric acid used,

N = normality of the standard hydrochloric acid, and

m = mass in g of sample taken for the test.

ANNEX B

[*Table* 1, *Sl No.* ii)]

DETERMINATION OF LOSS ON DRYING

B-1 APPARATUS

B-1.1 Vacuum Desiccator — 15 cm internal diameter.

B-1.2 Petri Dishes — 7 cm and 10 cm diameter.

B-2 REAGENTS — Phosphorus Pentoxide Desiccant.

B-3 PROCEDURE

Put phosphorus pentoxide desiccant in the 10 cm petri dish and distribute evenly over the bottom of the dish. Place the dish at the bottom of the desiccator. Dry the 7 cm petri dish at 100 °C, cool and weigh. Sieve the sample through a 150 micron IS Sieve (*see* IS 460), and weigh accurately, about 5 g in the small petri dish. Place the dish on the gauge of the vacuum desiccator. Cover the desiccator, making sure that the seal is effective, and evacuate so that the pressure remains between 5 mm to 10 mm of mercury during the drying period of 16 h. Release the vacuum, slowly and reweigh the sample and dish.

B-4 CALCULATIONS

Loss on drying, percent by mass = $\frac{100[m-(m_1-m_2)]}{m}$

where

m = mass in g of the material taken for the test,

m_1=mass in g of the petri dish containing sample after cooling, and

m_2 = mass in g of the empty petri dish.

ANNEX C

[*Table* 1, *Sl No.* iii)]

DETERMINATION OF WATER INSOLUBLE MATERIAL

C-1 APPARATUS

C-1.1 Weighing Bottle

C-1.2 Sintered Glass Crucible — average pore diameter 20 to 30 micron porosity No.3, or average pore diameter 5 micron to 15 micron (porosity No. 4).

C-1.3 Oven

C-2 PROCEDURE

Dry the crucible at 105 °C to a constant mass. Weigh accurately 20 g of sample and rinse with 100 ml water into the beaker. Heat to boiling and stir until all water soluble material has dissolved. Filter hot through the crucible and wash with hot distilled water. Dry the crucible and residue to a constant mass at 105 °C.

A-3 Calculations

Water insoluble material, percent by mass = $\frac{100(y-x)}{m}$

where

y = mass in g of the dried crucible with the residue,

x = mass in g of the dried crucible, and

m = mass in g of the material taken for the test.

ANNEX D

[*Table* 1, *Sl No.* iv)]

DETERMINATION OF THE COARSE MATERIAL INSOLUBLE IN WATER

D-1 PROCEDURE

Weigh accurately, about 30 g of the sample, mix with 200 ml of water in the stoppered measuring cylinder and shake the mixture for 10 minutes. Pour the solution through a 150 micron IS Sieve (IS 460), washing out any residue from the measuring cylinder with water on to the sieve. Wash the residue on the sieve several times with distilled water and allow to drain. Brush the residue remaining on the sieve on a glazed paper and then to the tared weighing bottle. Dry the weighing bottle and residue at 100 °C, cool and reweigh. Calculate the percent by mass of coarse material insoluble in water.

ANNEX E
(*Foreword)*

COMMITTEE COMPOSITION

Organization	*Representative(s)*
Directorate of Plant Protection Quarantine and Storage, Faridabad	DR RAVI PRAKASH ***(Chairperson)***
All India Biotech Association, New Delhi	SHRI SAURABH SINGHAL SHRI SHAH JI DHAR (*Alternate)*
Central Insecticide Board and Registration Committee, Faridabad	SECRETARY DR VANDANA SETH (*Alternate*)
Central Insecticide Laboratory, Faridabad	DR ARCHANA SINHA SHRI SUBHASH CHAUDHARY (*Alternate***)**
Consumer Guidance Society of India, Mumbai	SHRI SITARAM DIXIT DR M. S. KAMATH (*Alternate*)
Crop Care Federation of India, New Delhi	DR J. C. MAJUMDAR
Crop Life India, New Delhi	SHRI ASITAVA SEN MS NIRUPAMA SHARMA (*Alternate*)
CSIR -Indian Institute of Toxicology Research, Lucknow	DIRECTOR DR SHEELENDRA P. SINGH
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Food Safety and Standards Authority of India, New Delhi	ADVISOR (STANDARDS)
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Indian Agricultural Research Institute, New Delhi	DIRECTOR
Indian Institute of Packaging, Mumbai	DR TANWEER ALAM
Indian Pest Control Association, New Delhi	SHRI UDAYAN GHOSH
Institute of Pesticide Formulation Technology, Gurgaon	DR M. VAIRAMANI
Ministry of Agriculture, Department of Agriculture, Chennai	JOINT DIRECTOR OF AGRICULTURE (RES.) DEPUTY DIRECTOR LAB (*Alternate*)
National Centre for Integrated Pest Management, New Delhi	DR SUMITRA ARORA
National Institute of Plant Health Management, Hyderabad	DR MAHESH SAINI MS T. SRIDEVI (*Alternate*)
Pesticide Manufactures and Formulators Association of India (PMFAI), Mumbai	DR ARCHANA SRIVASTAVA DR UDAY KUMAR (*Alternate*)
Regional Pesticides Testing Laboratory, Chandigarh	SHRI V. VASU

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Member Secretary
SHRI KULDEEP MITTAL
SCIENTIST 'B'/ASSISTANT DIRECTOR
(FOOD AND AGRICULTURE), BIS

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